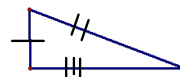


4-1 Classifying Triangles

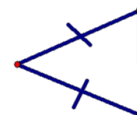
- By Sides
- By Angles

By Sides

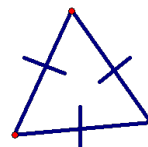
- Scalene
- No congruent sides



- Isosceles
- 2 congruent sides

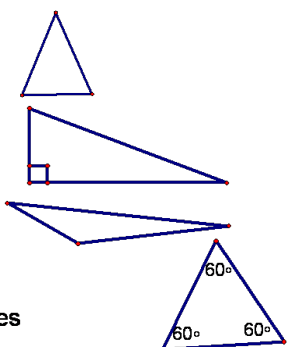


- Equilateral
- 3 congruent sides



By Angles

- Acute
 - 3 acute angles
- Right
 - 1 right angle
- Obtuse
 - 1 obtuse angle
- Equiangular
 - 3 congruent angles



Example

Classify the triangle by sides.

$\triangle ABC$ $A(-5, -2)$ $B(1, 4)$ $C(1, -2)$

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$AB = \sqrt{72} = 6\sqrt{2}$$

$$BC = \sqrt{36} = 6 \quad \text{isosceles}$$

$$AC = \sqrt{\quad} = 6$$

Example

Classify the triangle by sides.

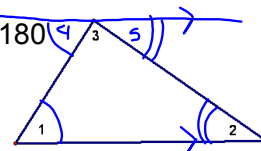
$\triangle AMY$ A(-3, 4) M(3, 1) Y(0, -2)

4-2 Angles of a Triangle

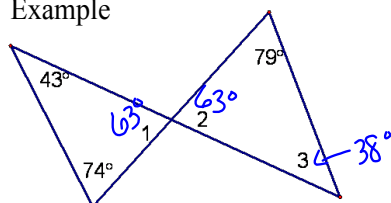
Theorem 4.1—**Angle Sum**

Theorem—the sum of the measures of the angles of a triangle is 180 degrees

$$m\angle 1 + m\angle 2 + m\angle 3 = 180$$

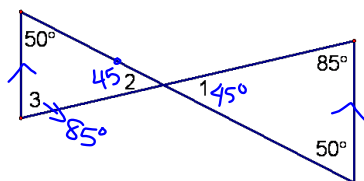


Example



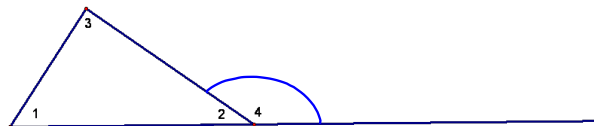
$$\begin{array}{r} 43 \\ + 74 \\ \hline 117 \end{array} \quad \begin{array}{r} 180 \\ - 117 \\ \hline 63 \end{array} \quad \begin{array}{r} 79 \\ + 63 \\ \hline 142 \end{array} \quad \begin{array}{r} 180 \\ - 142 \\ \hline 38 \end{array}$$

Example



Theorem 4.2—3rd Angle Theorem—If 2 angles of 1 triangle are \cong to 2 angles of another triangle, then the 3rd angles are \cong .

What is $\angle 4$ to 180?



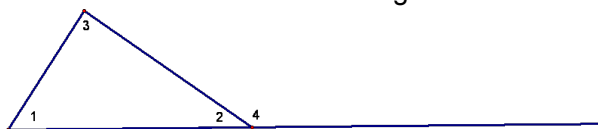
$$m\angle 4 + m\angle 2 = 180$$

$$180 = m\angle 1 + m\angle 2 + m\angle 3$$

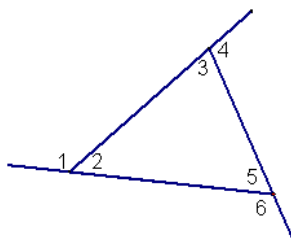
$$m\angle 4 + m\angle 2 = m\angle 1 + m\angle 2 + m\angle 3$$

$$m\angle 4 = m\angle 1 + m\angle 3$$

Theorem 4.3—Exterior Angle Theorem—The measure of an exterior angle of a triangle = the sum of the 2 remote interior angles.



$$m\angle 1 + m\angle 3 = m\angle 4$$

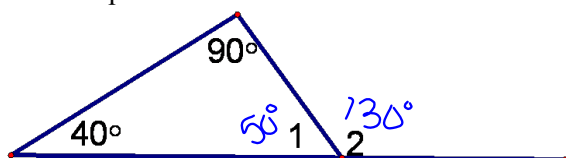


$$m\angle 1 = m\angle 3 + m\angle 5$$

$$m\angle 4 = m\angle 2 + m\angle 5$$

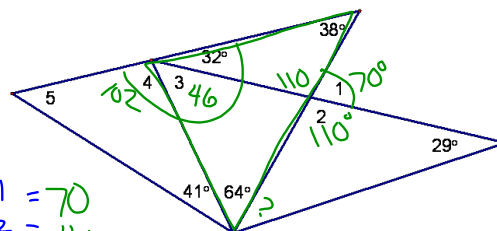
$$m\angle 6 = m\angle 1 + m\angle 2$$

Example



$$m\angle 2 = 40 + 90$$

Find the measures of the numbered angles.



$$\begin{aligned} m\angle 1 &= 70 \\ m\angle 2 &= 110 \\ m\angle 3 &= 46 \\ m\angle 4 &= 132 \\ m\angle 5 &= 37 \end{aligned}$$

Corollary- Statement that can be easily proven

Corollary 4.1—The acute angles of a right triangle are complementary

Corollary 4.2—There can be at most one right or one obtuse angle in a triangle

Homework

- p. 180-182 #s 7, 9-11, 33
- p. 189-190 #s 11, 12, 15-23, 33-38